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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

A Comparison of 16 Grasses and Forbs for Seeding Chaparral Burns

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Sixteen species and varieties of grasses and forbs were test-planted on the Tonto National Forest after the Boulder Mountain fire of June 1959. This wildfire swept over 21,700 acres of steep, broken chaparral between Roosevelt Reservoir and the south end of the Mazatzal Mountains.

An exploratory species adaptation study was begun on a small portion of the burn in July 1959 and completed November 1961. The study area was located near the Three Bar Experimental Watersheds at an elevation of 3,500 feet. Annual precipitation since the start of the study averaged 22.80 inches (table 1). Dominant vegetation on the site consisted of shrub live oak, birchleaf mountainmahogany, and sugar sumac. Little herbaceous vegetation was present before the fire. The aspect is northerly with approximately a 10 percent slope. The soil is a thin, gravelly, sandy loam derived from granitic parent material.

The main object of the study was to determine whether there are species other than weeping lovegrass adapted for seeding burns

in this type of chaparral. Weeping lovegrass was chosen as the standard for comparison because it has been widely seeded throughout the Arizona chaparral type. This species is easy to establish and produces large, vigorous plants valuable for livestock forage. It has a major weakness, however, in that many originally good stands have deteriorated rapidly and been lost within a few years.

PROCEDURE

The 16 species and varieties tested can be divided into warm-weather and cool-weather growers on the basis of growth habit. The warm-weather growers consisted of Caucasian, sand, Turkestan, King Ranch and little bluestem; Lehmann, sand and weeping lovegrass; switchgrass and buffelgrass. The cool-weather growers were composed of Cicer and sicklepod milkvetch, black and Indian mustard, a mixture of cold-hardy alfalfa varieties including Ladak, and Hardinggrass.

Planting was done in the fresh burn before the loose surface ash had been disturbed by

Table 1. --Precipitation in inches at reseeding test plots near Three Bar Experimental Watershed A, Tonto National Forest, Arizona¹

Year	: Jan.	: Feb.	: Mar.	: Apr.	: May	: June	: July	: Aug.	: Sept.	: Oct.	: Nov.	: Dec.	: Total
1959	0.76	4.56	0	0.15	0.16	0.28	0.37	7.30	0.73	7.85	0.61	9.60	32.37
1960	3.62	.93	1.17	0	.66	.10	.83	1.90	1.62	3.12	.41	.44	14.80
1961	2.04	.82	2.52	.03	0	0	1.54	1.67	4.24	.46	.59	7.31	21.22
Average													22.80

¹ Prefire average for 1957 and 1958 was 27.34 inches.

Table 2. --Relative success¹ and vigor¹ of 16 species and varieties test seeded by broadcast on the fresh ashes of a chaparral burn, July 17, 1959

Species	September 1959		June 1960		November 1960		November 1961	
	: Relative : : success :	Vigor	: Relative : : success :	Vigor	: Relative : : success :	Vigor	: Relative : : success :	Vigor
Alfalfa (mixture of cold-hardy varieties)	T	G	O	--	O	--	O	--
Bluestem								
Caucasian	F	G	P	P	P	G	VP	G
King Ranch	G	G	F	F	G	E	G	E
Little	T	F	O	--	O	--	O	--
Sand	T	F	O	--	O	--	O	--
Turkestan	T	G	F	G	F	E	F	E
Buffelgrass	E	E	O	D	P	E	T	G
Hardinggrass	T	F	VP	F	O	--	O	--
Lovegrass								
Lehmann	E	E	G	F	E	E	E	E
Sand	T	G	O	--	T	F	O	--
Weeping	F	G	F	E	F	E	F	F
Milkvetch								
Cicer	T	E	VP	G	P	E	P	E
Sicklepod	T	G	VP	G	P	E	P	E
Mustard								
Black	O	--	F	G	F	E	F	E
Indian	O	--	F	G	P	G	F	E
Switchgrass	T	F	O	--	O	--	O	--

¹ Key to ratings: E = excellent
 G = good
 F = fair
 P = poor
 VP = very poor
 T = trace
 O = failure
 D = dead

rain. Each species was broadcast planted with a hand seeder in an unreplicated plot approximately 1/8 acre in size. There is a possibility that some poor seed may have been planted since there was no time for seed-germination tests.

Ocular ratings as shown in table 2, were made on each species and variety tested. The relative success rating is based on density and distribution of plants in the stand, together with their general appearance. The vigor rating is based entirely on the size and appearance of the individual plants.

RESULTS

Lehmann lovegrass (fig. 1) and King Ranch bluestem were the outstanding species throughout the duration of the study with average ratings of excellent and good, respectively. Turkestan bluestem, weeping lovegrass, and black and Indian mustard rated fair. Ratings of all other species and varieties ranged from poor to failure.

Buffelgrass at the start was the most vigorous species and rated excellent the first growing season. This stand died during the first winter, however. A poor stand composed entirely of new seedlings became established the second growing season but was killed during the second winter. The third growing season only a few scattered buffelgrass seedlings could be found.

Weeping lovegrass maintained a fair stand during the three growing seasons of the study. At the last observation, however, numerous dead plants were found. These apparently had been drought killed. Black and Indian mustard did not germinate and become established until the first winter after they were planted, but



Figure 1.--Lehmann lovegrass test planting on chaparral burn at the end of the third growing season.

have maintained fair stands since that time. Poor stands of Caucasian bluestem and Cicer and sicklepod milkvetch are maintaining themselves. Poor initial stands of sand lovegrass, alfalfa, Hardinggrass, switchgrass, and sand and little bluestem died out before the end of the study.

Turkestan and King Ranch bluestem, black and Indian mustard, and Lehmann lovegrass are all reproducing by natural reseeding.

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COMMON AND BOTANICAL NAMES OF SPECIES MENTIONED

Alfalfa	<u>Medicago sativa</u>
Bluestem, Caucasian	<u>Andropogon caucasicus</u>
Bluestem, King Ranch	<u>A. ischaemum</u> hort. var. KING RANCH
Bluestem, little	<u>A. scoparius</u>
Bluestem, sand	<u>A. hallii</u>
Bluestem, Turkestan	<u>A. ischaemum</u>
Buffelgrass	<u>Pennisetum ciliare</u>
Hardinggrass	<u>Phalaris tuberosa</u> var. <u>stenoptera</u>
Lovegrass, Lehmann	<u>Eragrostis lehmanniana</u>
Lovegrass, sand	<u>E. trichodes</u>
Lovegrass, weeping	<u>E. curvula</u>
Milkvetch, Cicer	<u>Astragalus cicer</u>
Milkvetch, sicklepod	<u>A. falcatus</u>
Mountainmahogany, birchleaf	<u>Cercocarpus betuloides</u>
Mustard, black	<u>Brassica nigra</u>
Mustard, Indian	<u>B. juncea</u>
Oak, shrub live	<u>Quercus turbinella</u>
Sumac, sugar	<u>Rhus ovata</u>
Switchgrass	<u>Panicum virgatum</u>